Vol. 89, No. 11 Plumbing • Heating • Cooling November 2009

Reeves Journal

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Hyper-Efficient Pumps

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the new thing in PUMPS

So you think you're recommending the most efficient hydronic circulators?

By The Reeves Journal Staff

Everything's "green" these days. A person can hardly walk down the street without being bombarded with the eco-friendly message from purveyors of everything from chewing gum to automobiles. The plumbing industry is no different—manufacturers are continually looking to provide the most energy- and water-efficient products so contractors can educate customers about them and consumers can be satisfied their new system is as efficient as can be.

Which brings us to radiant hydronic heating. Contractors who have been involved in designing and installing these systems for a while know their customers like to be hanging out right on the jagged edge of efficiency while reveling in the kind of comfort only radiant heating can provide. With a modulating/condensing boiler providing the heat with efficiencies of up to 98 percent, there doesn't seem to be all that much to do to a well-designed radiant system to make it even stingier with the utilities.

Not so fast, grasshopper. Every radiant hydronic system has a circulator of some kind, right? And those circulators use electricity, right?

Of course. And manufacturers have been delivering the hardware over the past several years. First there was standard fixed-speed pumps that eventually led to multiple-speed pumps, and both types have provided reliable performance in radiant hydronic and other applications for years. The problem is that fixed- or multi-speed pumps can sometimes use more electrical energy than necessary, especially when under partial-load conditions.

The adoption of electronically commutated motors [*See, "Pump Tech," RJ, Apr. 2007, pg. 60—Ed.*] and the application of their internal scheme for energizing the motor's windings coupled with redesigned impellers and other tweaks have significantly improved overall pump efficiency.

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But there is another kind of pump out there and the experts say if someone wants the most efficiency possible from a radiant hydronic heating system—or any zoned hydronic system, for that matter—that person is going to want to take advantage of variable speed circulator technology.

Grundfos' Alpha variable speed circulator with the AutoAdapt system features a real-time system that displays both energy use in watts and the system's flow in gallons-per-minute. Photo courtesy of Grundfos.

Two of the main players in the North American variable-speed circulator market today are the Grundfos Pump Corp. with its Alpha circulators, and Taco with its Taco 00 Variable Speed Delta-T Circulators. The Grundfos Alpha, with its built-in AutoAdapt feature and pressure differential control, boasts up to 80 percent energy savings and operation on as little as 5 watts. Taco said its 00 Variable Speed Delta-T Circulators allow the operational speed to vary based on the temperature differential between the supply and return piping while reducing fuel consumption between 4- and 5 percent.

It's important not to get too hung up on Delta-T versus Delta-P when it comes to variable speed circulators, though—the type of control is best evaluated on an application-by-application basis, manufacturers say. Both claim efficiencies and savings and something a contractor can offer as part of an overall package of efficient products. The real buzz—the thing contractors and consumers ought to be excited about—is the variable speed technology. Simply put, that's where the efficiency is.

"Each [type of control] might have an application that may make it more beneficial than the other," said Mark Chaffee, the Cranston, R.I.-based director of marketing, residential products, for Taco. "You have to control the variable speed somehow. You have to look at the fact there are a number of choices when it comes to variable speed technology. First, let's decide to go variable speed. Then you'll pick the right circulator for the application you're trying to achieve."

Ignoring the type of control used on the circulator for the purposes of this article, what is it that makes variable speed circulators so efficient compared to single- or multi-speed circulators? Well, imagine the gas pedal on your car only has three positions—"Off," "Half," and "Full." Now let's say the half-throttle position gives your car a forward speed of 50 MPH. Your problem arises when you enter a 30 MPH zone—you need to leave your throttle in the "Half" position and then adjust your speed by riding the brakes to slow down.

This is inefficient and it wastes energy.

A variable speed circulator is actually more like the way the gas pedal in your car works in the real world—it provides an almost infinite number positions between "Off" and "Full" and, when the speed limit on the road (system demand) is 30 MPH, you can select a throttle position (circulator RPM) that gives you your 30 MPH speed (GPM of fluid flow.) Of course, it's actually the electronic controller that selects the throttle position in our example, but it's the variable speed technology that adds up to excellent efficiency numbers. And that is something contractors can sell.

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"Any time a contractor or installer can incorporate some sort of variable-speed technology you're saving the customer money," said Bob Reinmund, Grundfos' Olathe, Kan.-based senior product specialist—domestic building services. "As an industry we need to stress variable speed technology, no matter how it's controlled. We're doing the consumer some good here—we're saving them a lot of money."

It's easy to make claims of energy efficiency. Nailing down a percentage of their energy bills your customers will see reduced if they switch their system to a variable speed circulator is only a broad stroke, ballpark estimate at best. Running the numbers in detail using local energy costs and specs supplied by manufacturers would be a good place to start: "That's probably the most straightforward way," Reinmund said. ■

Variable Speed Delta-T circulators by Taco combine a microprocessor-based variable speed differential controller with the reliability and convenience of Taco's 00 cartridge circulators. Photo courtesy of Taco.